REMARKS

The application has been amended and is believed to be in condition for allowance.

Amendments to the Disclosure

Claim 89 is amended to address the Official Action’s rejection for indefiniteness, as further provided below. The amendment finds support in the specification and the drawing figures as originally filed (e.g., page 15, lines 15-25).

Claim 86 is canceled, without prejudice.

The claims are further amended with minor, non-substantive revisions in consideration of U.S. claim style and readability.

No new matter is introduced by way of the foregoing amendments.

The claims as amended are all believed to be readable on the elected Group II, drawn to an apparatus, and further to the elected species Group A2 and Group B3, each as identified in the Office Action of December 6, 2010.

Formal Matters - Section 112, second paragraph

The Official Action rejected claims 86 and 89 under 35 USC 112, second paragraph. The Official Action stated that the recitations "measures the composition of the CIGS layer directly" of claim 86 and "measures the composition of the CIGS layer indirectly" of claim 89 are indefinite.

In response, claims 86 and 89 are amended in a manner believed to overcome this rejection. Withdrawal of the rejection under 35 USC 112, second paragraph is thereby respectfully requested.

Substantive Issues - Section 103

The Official Action rejected claims 80-81, 85-86, 88-89, and 91 under 35 USC 103(a) as being unpatentable over Chen et al. (US 5,141,564, hereafter "CHEN"), in view of Regittnig (US Pub. 2001/0022992, hereafter "REGITTNIG").

The Official Action rejected claim 82 under 35 USC 103(a) as being unpatentable over CHEN and REGITTNIG, and further in view of Yamazaki et al. (US Pub. 2002/0139303, hereafter "YAMAZAKI").

The rejections are respectfully traversed. It is respectfully submitted that none of the references applied by the Official Action, whether considered individually or in combination, teach or suggest at least one composition detection device for detecting the respective amounts of deposited elements in the CIGS at each of the rows, and a controller connected to said detection device adapted for adjusting the evaporant fluxes in the respective rows in response to a detected variation in deposited amount of the corresponding element in order to provide a CIGS layer of uniform composition of elements, as recited by the independent claim 80 (emphasis added).

The Office Action offers CHEN at column 5, lines 48-51 as teaching control of evaporation rates for various elements.

In CHEN column 5, lines 48-51 control of the evaporation rate for Se is accomplished by a quartz crystal controller. In the common meaning of this technique, the mass change (by a deposited film) of <u>an oscillating quartz crystal located in the evaporant flux</u> is derived by measuring the change in the oscillating frequency of the quartz crystal in response to the mass change.

Control of the evaporation rates for Cu, Ga, and In is disclosed in CHEN column 5, lines 48-51 as accomplished by an electron impact emission spectroscopy evaporation rate controller. In the common meaning of this technique, the <u>evaporant flux out of the source</u> is <u>passed through a sensor</u>, wherein the evaporant species are excited by an electron bombardment and the emission is measured.

Hence, CHEN is directed to measuring <u>fluxes</u> at the sources.

In contrast, determination of the <u>composition</u> in the CIGS is accomplished not only by the fluxes from the sources, but <u>also</u> determined by the <u>probability</u> that the species that reach the surface of the growing layer on the substrate sticks and stays thereon.

Also, the difference in the location of flux sensors and the substrate results in an <u>uncertainty</u> as to how much of the

evaporant flux actually reaches the surface of the growing film on the substrate. In the case of using a quartz crystal controller as in CHEN, this is further complicated by the fact that the probability of the species reaching, sticking, and staying on the quartz crystal may be different than that on the surface of the growing layer on the substrate. CHEN makes no teaching that these drawbacks exist, and further gives no suggestion how they could be overcome.

In the present invention, on the other hand, the composition detection device or devices as recited by claim 80 are for detecting the respective amounts of deposited elements in the CIGS, and thereby the drawbacks above are overcome. The devices of CHEN do not teach or suggest this.

Furthermore, CHEN discusses controlling the evaporation rates only in conjunction with a batch deposition reactor (see CHEN column 4, lines 66-67). In the description of an in-line system in CHEN, starting in column 6, line 45, no suggestions are given to control of the evaporation rates.

For example, there is no hint in CHEN Figure 3, and certainly not in the CIGS process area 89 or in conjunction of CIGS process area 89, of any means present for controlling the evaporation rate. CHEN further fails to teach or suggest any composition detection device for detecting the amounts of deposited elements in the CIGS and controlling these amounts.

In addition, the Official Action concedes that CHEN fails to teach or suggest evaporation sources provided in rows over the width of a substrate. It follows that CHEN further fails to teach or suggest a controller adapted to adjust the evaporant fluxes in the respective rows in response to a detected variation in deposited amount of the corresponding element.

The Official Action offers REGITTNIG as teaching a plurality of rows of evaporation sources 11 can be placed side by side, in order to vaporize (metallize) the width of the substrate 8 as well as the whole length thereof with one pass.

However, REGITTNIG fails to overcome the deficiency outlined above. Further, even if the skilled person were to modify CHEN to have a plurality of rows, the resulting combination would not teach or suggest a controller adapted to adjust the evaporant fluxes in the respective rows in response to a detected variation in deposited amount of the corresponding element, thereby to provide a CIGS layer of uniform composition of elements.

It is therefore respectfully submitted that, based at least on the reasons set forth above, CHEN and REGITTNIG, whether considered individually or in combination, fail to teach all the features recited in claim 80. It if further respectfully submitted that YAMAZAKI fails to overcome the shortcomings of CHEN and REGITTNIG.

Accordingly, it is respectfully submitted that claim 80 is patentable over the references raised by the Official Action. It is also respectfully submitted that the claims depending from claim 80 are patentable at least for depending from a patentable parent claim.

Withdrawal of the rejections under Section 103 is thereby respectfully requested.

From the foregoing, it will be apparent that Applicants have fully responded to the February 8, 2011 Official Action and that the claims as presented are patentable. In view of this, Applicants respectfully request reconsideration of the claims, as presented, and their early passage to issue.

In order to expedite the prosecution of this case, the Examiner is invited to telephone the attorney for Applicants at the number provided below if the Examiner is of the opinion that further discussion of this case would be helpful in advancing prosecution.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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